Instructions for Operating RGB LED Based Fire Sim and Validation

Firebots Project

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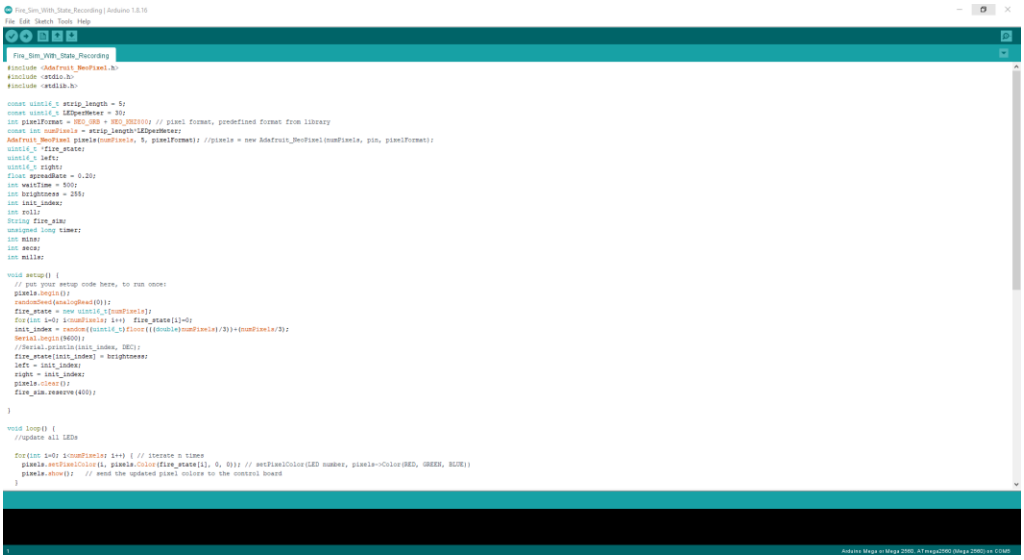
Operating The Fire Simulation

1. Open Arduino IDE. Arduino IDE can be downloaded from www.arduino.cc.
2. Download the Arduino Code Fire_Sim_With_State_Recording.

   Figure 1: Fire Sim with State Recording

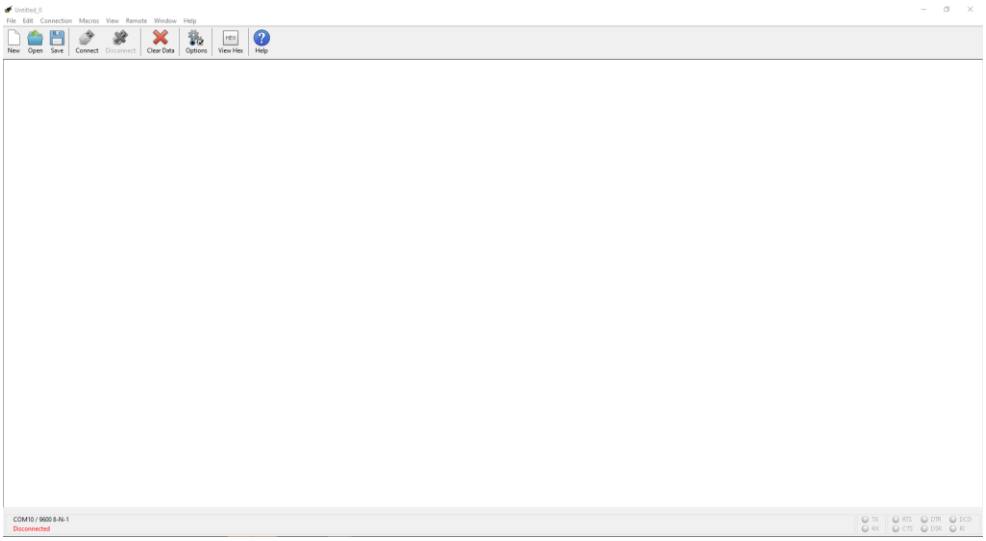


   Context: *Fire_Sim With State Recording animates the RGB LED strip to control the pattern of lights on the strip to simulate a fire starting from the center and propagating out semi randomly from the center of the LED strip. While the LED strip is simulating the fire it is using serial to send out the fire state in real time.*
3. Connect RGB LED strip to a 5V power supply that is at least capable of outputting 4 amps.
4. Connect ground on Arduino to ground on LED strip and the data pin to digital pin 5 on the Arduino.
5. Compile the code to Arduino.
6. Download CoolTerm on your PC from the website Roger Meier's Freeware (the-meiers.org)

   Context: *CoolTerm is a serial port terminal application that can capture, timestamp, and record data from a device transmitting data into your PC using a serial connection.*

7. Open CoolTerm.

Figure 2: The Cool term Interface

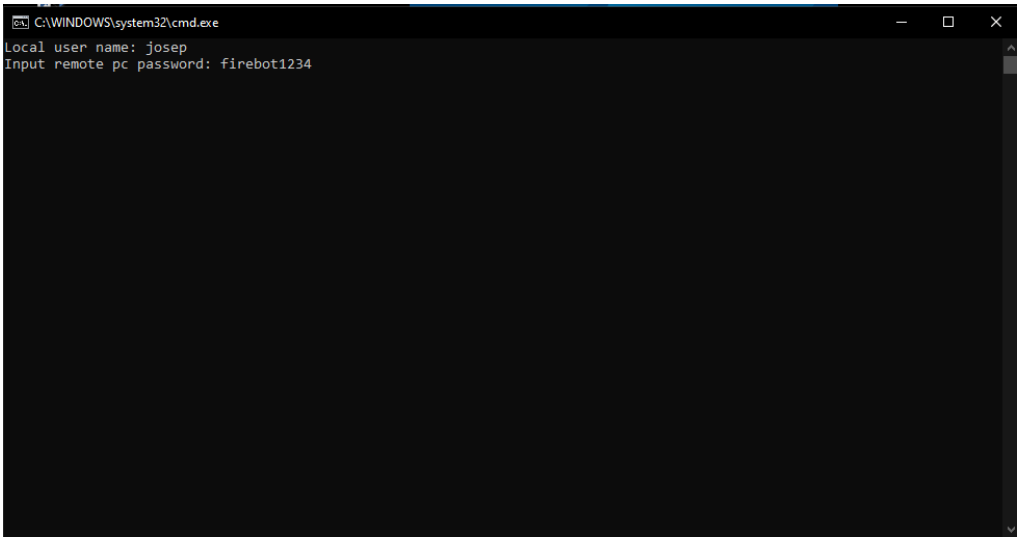


8. Go to Options. In the serial port menu select the serial port you're using and the Baudrate 9600.
9. Go to the Receive menu in options, and check the box that says Add timestamps to captured data, and change type from "Date and Time" to "Time only". Note: This has to be done every time you start CoolTerm. The software doesn't seem to memorize settings.
10. Click Ok to leave the Options Menu.
11. Press Connect to connect to Arduino from CoolTerm. Make Sure that the Fire_Sim Sketch is preloaded, and the Arduino serial monitor is closed.
12. When you're ready to record the Fire State click "Connection", click "reset port" to restart the fire sim and go to "Connection" "Capture Text/Binary File" and click start. A box will prompt you for the name and save location of the file. (If you're recording for validation purposes start to record on the robot at the same time. Refer to robot operating instructions)
13. When you're done go to "Connection" "Capture Text/Binary File" and "Stop" to stop recording to the text file. (If you're recording for validation purposes stop the validation on the robot around the same time. Refer to robot operating instructions)

Validation

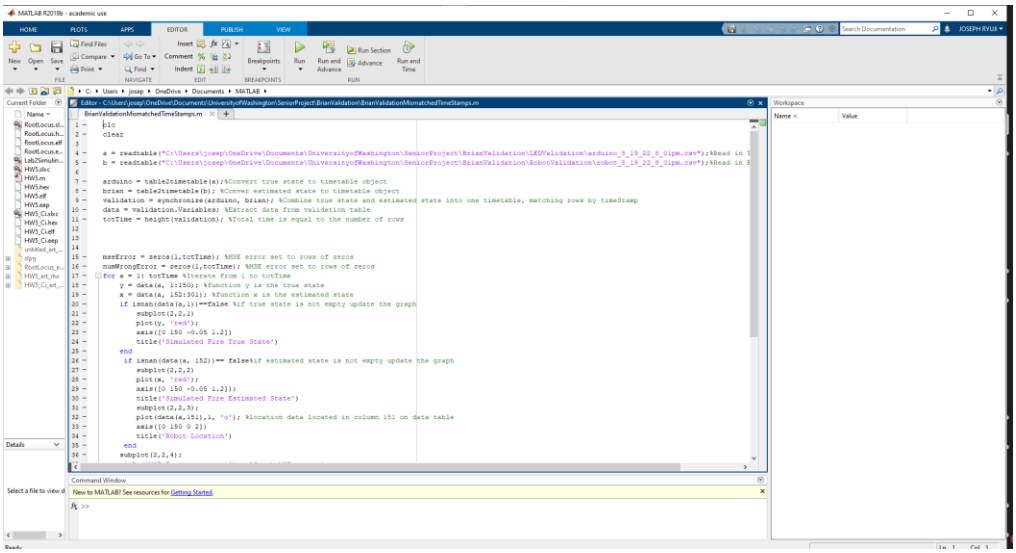
14. Convert the .bag file data on the robot to CSV.
15. Download copy.bat. Modify line 4 to match the ssh ID of the robot if needed.
16. Click on copy.bat

Figure 3: copy.bat



17. Type in your username and robot password.
18. The estimated state you recorded should be downloaded to your desktop as state.csv.
19. Rename and move the file to wherever you need it.
20. Download “BrianValidationMismatchedTimestamps.m”

Figure 4: BrianValidationMismatchedTimestamps.m



21. If you haven’t already convert your Fire_Sim validation file to a .csv file by erasing .txt and saving as a .csv
22. In the function a = readTable() on line 4, replace the existing file name for the validation file from the Arduino

23. In the function b = readTable() on line 5 replace the existing file name with the name of the robot validation file. Must be a CSV
24. Click Run